



THERAPEUTIC VALUES OF ROSE

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ABSTRACT

A lot of drugs, with their therapeutic values, come along with their side-effects. These side effects vary from an individual's disease state, age, weight, gender and genetic makeup. Such reasons are making us to shift towards the natural products which have equivalent therapeutic values, with minimum or no side effects. Many such natural products are being harvested from the herbs. One such very important herb is rose plant, which can be used to treat diseases like arthritis, depression and cancer etc. Various parts of the rose plant (petals, hips etc) have high content of bioactive compounds - tocopherols, β -carotene, lycopene, pectins, sugars, organic acids, amino acids and essential fatty acids and are rich in flavonoids, tannins, antioxidants, and vitamins A, B₃, C, D and E. The present article is a detailed review on therapeutic properties of different species of rose based on its antioxidant, anti-inflammatory, antimicrobial and anticancer properties etc.

Keywords: Aromatherapy, Arthritis, Anti-Cancer, Anti-Inflammatory, Anti-Oxidant, Essential Oils, Therapeutic Values

I. INTRODUCTION

A natural product is a chemical compound or substance produced by a living organism that is, found in nature. In the broader sense, natural products include any substance produced by life, though; it can also be prepared by chemical synthesis of certain molecules. Some of the sources of natural products are: microbial world, marine, plants and animals. We are now turning towards to use natural products in place of modern day's medicine as, a lot of drugs are associated with side-effects, they are costly and sometimes they have only one molecular target for a particular disease. Many plants [1]. Various species/varieties of rose (*Rosa damascena*, *Rosa canina*) are reported to carry various pharmacological properties. Gulkand is a very famous Indian product made of rose (*Rosa damascena*, figure 1.) and sugar which has been reported to have many properties like it is used as laxative[2], to make flavoured milk[3].

These herbs have a history to be used for their therapeutic properties that soothe the mind and help with depression, nervous tension and stress. [4] An Iranian doctor, Avicenna, discovered the process for extracting rose water from rose petals in the early 11th century. These roses were introduced into England during the reign of Henry VIII and were customarily used at weddings and festivals[4]. Also, products from rose like rose essential oil, is widely used in perfume and cosmetic industry. [5], and in anti-bacterial activity (E. Basim,



“Antibacterial activity of Rosa damascena essential oil”,Fitoterapia. 2003 Jun; 74(4):394-6.) and as anti-oxidants in food. [6]

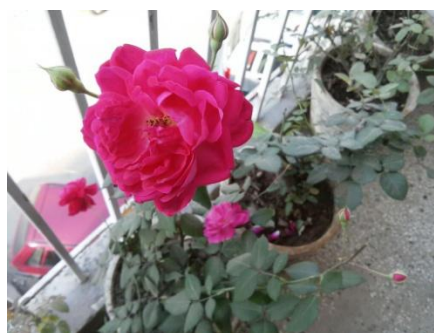


Figure 1. Indian rose (*Rosa damascena*)

II. CLASSIFICATION OF THE PLANT

Rose belongs to the family Rosaceae. This family usually has characteristic feature like 5 sepals, 5 petals, numerous stamens and leaves are alternate, simple, divided or lobed [7] Taxonomical classification of this plant is given as below.

Domain:Eukaryote

Kingdom:Plantae

Phylum:Magnoliophyta

Class:Magnoliopsida

Order:Rosales

Family: Rosaceae

III. PHYTOCHEMISTRY OF THE PLANT

Majorly secondary metabolites obtained from plants are responsible for their pharmacological properties [8]. Major Phytochemicals of rose and the plant part from which they are isolated are tabulated in TABLE 1.[9]

Table 1.Phytoconstituents of the rose

Plant part	Uses /Therapy	Remarks
Seeds	To cure muscular pain	Inhibits leukocyte functions that causes cell injury
Petals	To evaluate Anticancer activity, treatment of skin problems	Anti-microbial activity, anti-mutagenic
Leaves	Herbal tea	Removes impurities in blood, cools the body
Roots	To cure eye inflammation	Anti-inflammatory property
Rose hips	To cure common cold, arthritis	Flavonoids, vitamin C
Rose oil	To reduce depression	Extract used in aroma therapy



IV. ANTIOXIDANT POTENTIAL

Antioxidant property of majority of the plant products are widely reported to be responsible for their therapeutic potential. In case of rose also it is known to have a very good antioxidant potential. [10]Rose hip of this plant is very well known for antioxidant potential. [11]It is pseudo-fruit of the rose plant, which is widely known as a valuable source of polyphenols and vitamin C. They have been used for herbal teas, jam, jelly, syrup, rose hip soup, beverages, pies, bread, wine, marmalade, etc. [12]It is popular in health promoting products as the fruits contain high content of bioactive compounds such as: tocopherols, β -carotene, lycopene, pectins, sugars, organic acids, amino acids and essential fatty acids. [13]

Both in vivo and in vitro studies have demonstrated that this fruit exhibits anti-inflammatory and anti-oxidant properties. The year 2014 has reported rose fruits to have IC_{50} values i.e., half maximal inhibitory concentration (IC_{50}) is a measure of the effectiveness of a substance in inhibiting a specific biological or biochemical function. Minimum inhibitory concentration (MIC) as 72.5-80 μ L mL⁻¹, 130 μ g mL⁻¹ and 5.7 mg GA g⁻¹ respectively, along with some of the antioxidant activities.

The antioxidant property may be related to the polyphenols and flavonoids present in the extract. Some assays are carried out in vitro to investigate the antioxidant potential and phenolic content. One such assay is performed using in vitro models such as 2, 2-diphenyl-1-picrylhydrazyl, nitric oxide radical, hydroxyl radical, superoxide radical scavenging activity and total antioxidant activity to test the antioxidant potential spectrophotometrically. Total flavonoid and phenolic content in samples can be estimated using aluminium chloride colorimetric and Folin-Ciocalteu method. [14]

V. ANTI-INFLAMMATORY POTENTIAL

Rosehips are majorly used to treat diseases namely, arthritis, rheumatism, and diabetes etc.[15] As, rosehip extract contains polyphenols and anthocyanins, it is believed to ease joint inflammation and prevent joint damage inhibiting production of inflammatory proteins and enzymes, including COX-1 and COX-2[16]. Antioxidants are substances that can override harmful molecules (free radicals) which are produced within your cells and which may cause tissue damage or disease. Other studies have found that it can reduce the production of specific enzymes that break down cartilage.

There was one study performed on Erythrocytes (RBCs) as a relevant human cell model in the investigation of bioavailability and antioxidant protection of components from rose hip against oxidative stress[17] Erythrocytes contain 90% of their weight as haemoglobin, and the cells stabilize this protein with intracellular GSH level in our body the high level of GSH concentration quenches reactive oxygen species-mediated structural haemoglobin damage which can occur as a result of superoxide formation, which in turn arises from normal oxygen carriage. They confirmed the uptake of antioxidants by the erythrocytes, the content of polyphenols was measured in erythrocytes treated with the polyphenol rich extract. They suggested that the protective capacity of the ascorbic acid as well as other compounds.



VI. ANTI ARTHRITIS

Arthritis, also called joint inflammation, causes pain and stiffness in joints, which worsen with age. It is most common among women. There are about 100 types of arthritis, and relative conditions: Osteoarthritis, Rheumatoid, Infectious arthritis, Metabolic Arthritis etc. Rheumatoid arthritis (RA) is an autoimmune disorder and it occurs when our body's immune system attacks the tissues of the body itself. These attacks affect the synovium, a soft tissue in your joints that produces a fluid that nourishes the cartilage and lubricates the joints. Rose hip powder of *Rosa canina* (rosehip) has been reported to reduce pain in osteoarthritis patients[18].The impact of standardized rose-hip powder was assessed on mobility of the hip and knee joints, activities of daily living, quality of life, and pain in patients with osteoarthritis. Standardized rose hip powder produced from seeds and husks of fruit of a subtype of *Rosa canina* has the ability to inhibit leukocyte functions that cause cell injury in OA. After the course of this experiment, Hip joint mobility improved significantly in the treatment group compared with the placebo group ($P = 0.033$). Similarly, pain decreased significantly in the treatment group compared with the placebo group ($P = 0.035$). The group treated with standardize rose-hip powder showed improvement in Activities of Daily Life, like walking down the street, getting out the car, shopping. There are many other reports presented by Willich SN ,Rose hip herbal remedy in patients with rheumatoid arthritis - a randomized controlled[22]and Kirkeskov B, The effects of rose hip (*Rosa canina*) on plasma anti-oxidative activity and C-reactive protein in patients with rheumatoid arthritis and normal controls: a prospective cohort study[23]which also have shown the improvement in pathological conditions of arthritis by using rose hip extracts.

VII. ANTI CANCER ACTIVITY

Cancer is a disease caused due to abnormal cell growth. There are many types of cancers such as: Lung cancer, Leukemia, Human colon cancer-etc. Essential oil obtained from *Rosa damascene* has been evaluated for its anticancer activity on human colon cancer cell line (SW742) and human fibroblast cells[19]. Fibroblast cells were investigated with cell culture and the cells were induced with different volumes of essential oil. The cells were counted after 48hrs of incubation. It was shown that the proliferation of cell was increased by the soluble part of *Rosa demanscena* oil and the proliferation decreased using the non-soluble part. It was concluded that essential oil affected the cell survival by in two ways.

Hagaget al, in the year 2014 also evaluated anticancer effect of concrete and absolute rose oils from *Rosa damascene trigintipetala*). The result show that both concrete and absolute rose oils when tested on cultures of normal human blood lymphocytes were cytotoxically and genotoxically safe at a dose of 10 $\mu\text{g/ml}$. Concrete and absolute oils exerted a cytotoxic activity against two kinds of human cancer cell lines: HepG2 and MCF7. Absolute oil was also shown to have anti-mutagenic activity at the same dose. Investigations are needed to study the activity of higher doses of both oils in vitro and in vivo in experimental animals in order to evaluate that how capable these oils are as a therapeutic for treatment of some kinds of cancers.

In one more study, Venkatesan et al in the year 2014 have synthesize silver nanoparticles (G-SNPs) by aqueous extract of petals of *Rosa damascena* and evaluate the anti-cancer activity against human lung adenocarcinoma



(A549) using MTT assay. These particles were found to be biocompatible having anticancer activity against human lung adenocarcinoma.

VIII. ANTI-DEPRESSION AND PAIN RELIEVING ACTIVITY

Pleasant smells are known to alter mood and neurocognitive functions, also. Aromatherapy has been practiced since ancient times and may be based on these properties of essential oils. Natural oils extracted from flowers, bark, stems, leaves, roots or other parts of a plant enhance psychological and physical well-being.

Conrad P, Adams Chave investigated the effects of aromatherapy on anxiety and/or depression in the high risk postpartum woman and to provide a complementary therapy tool for healthcare practitioners. 28 women, 0-18 months postpartum period were subjected to aromatherapy treatment. Treatment consisted of 15 min aromatherapy sessions, twice a week for four consecutive weeks. An essential oil blend of *Rose otto* and *Lavandula angustifolia* in 2% dilution was used in all treatments. It was found that all subjects completed the Edinburgh Postnatal Depression Scale (EPDS) and Generalized Anxiety Disorder Scale (GAD-7) at the beginning of the study. [20]

Effects of rose oil (*Rosa damascena*, Rosaceae) alone were experimentally proven by Hongratanaworaki Tin the year 2009 on human autonomic parameters and emotional responses in healthy subjects after transdermal absorption. [21]. Among 40 healthy volunteers 5 autonomic parameters, i.e. blood pressure, breathing rate, blood oxygen saturation, pulse rate, and skin temperature, were recorded. It was observed that rose oil caused significant decreases of breathing rate, blood oxygen saturation and systolic blood pressure, which indicate a decrease of autonomic arousal. The subjects found themselves in emotionally more calm and relaxed.

In another study by Marofi M et al in the year 2015, 64 children of 3-6 years of age were selected to evaluate if, aromatherapy can help in relieving post-operative pain score. Patients in one group were given inhalation aromatherapy with *R. damascene*, and in second group, the patients were given almond oil as a placebo. Inhalation aromatherapy was used at the first time of subjects' arrival to the ward and then at 3, 6, 9, and 12 h afterward. Common palliative treatments to relieve pain were used in both groups. Thirty minutes after aromatherapy, the postoperative pain in children was evaluated. It was observed that after each time of aromatherapy and at the end of treatment, the pain score was significantly reduced in the aromatherapy group with *R. damascena* compared to the placebo group. So it was suggested that aromatherapy with *R. damascena* can be used in postoperative pain in children, together with other common treatments without any significant side effects.

IX. CONCLUSION

After doing an exhaustive research on therapeutic values of Rose and its parts, we conclude that it plays a major role in the field of medicine. Many honoured researchers have done their research extensively and found that rose oil; rose hip can be used as anti-oxidants and as anti-inflammatory molecules. Switching to Rose and other medicinal plants can prove to be a better alternative than drugs which have chemicals in the composition and cause severe side effects. Herbal drugs, like rose hip and of other medicinal plants if cause side effects are not



life threatening. The manufacturing of drugs having chemical composition might have adverse effect on the environment, therefore, rose plays a better role as herbal drug since it does not create any hindrance to the cycle of nature.

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